



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,207	02/03/2004	Sebastian Lange	MS1-1823US	4217
22801	7590	10/11/2007		
LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			EXAMINER DOAN, TRANG T	
			ART UNIT 2131	PAPER NUMBER
			MAIL DATE 10/11/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/772,207

Applicant(s)

LANGE ET AL.

Examiner

Trang Doan

Art Unit

2131

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-45 are pending for consideration.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-11 and 12-17 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Those claims are directed to simulating the execution of all executions paths of one or more assemblies in managed code, which recite computer software components for manipulating data.

Data structure is not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760. Such claimed data structures do not define any structural and functional interrelationship between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized.

In contrast, a claimed computer-readable medium encoded with a data structure defines structural and functional interrelationship between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory.

Claims 19-25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Those claims recite one or more computer-

Art Unit: 2131

readable media comprising instructions to execute codes in managed code. However, in the specification, on page 21, paragraphs 0053-0055, Applicant recites "computer readable media may comprise computer storage media and communications media"...communication media typically embodies data structures, program modules, or...a modulated data signal, such as carrier wave." According to the MPEP, Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101.

Claims 26-45 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Those claims recite a/an apparatus/device but the apparatus/device is not limited to a tangible medium. Data structure is not claimed as embodied in computer-readable media are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. See, e.g., Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760. Such claimed data structures do not define any structural and functional interrelationship between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Regarding claims 1-45, the limitation "managed code" is not clear to the Examiner. Applicant needs to further specify what the "managed code" means.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Koved et al. (reference U) (hereinafter Koved).
8. Regarding claim 1, Koved discloses simulating the execution of all execution paths of one or more assemblies in managed code to find a set of required permissions for each said execution path, wherein: the managed code is a managed shared library or an executable (Koved: on page 1, column 2, under INTRODUCTION heading, second paragraph: "developer reads ... libraries used (including the Java run-time libraries") and reduces the required access rights); and each call in each execution path has a corresponding said permissions set (Koved: on page 2, column 1, first and

second paragraph; and page 3, column 1, first paragraph: "this paper describes a technique...automatically determine access rights required by Java programs or libraries...we computes the set of Permission objects to associate with each program point by constructing an access rights invocation graph (ARIG) to propagate the access rights." "Permission.implies...but to discover authorization requirements by analyzing all possible paths through the program.").

9. Regarding claim 2, Koved discloses wherein the execution paths for only one said assembly in managed code are simulated to find the set of required permissions for each said execution path by a union of the permissions for each said execution path (Koved: on page 2, column 2, third paragraph; page 3, column 1, first paragraph; and page 3 and page 4, under Authorization Model section: "In this paper...an invocation graph and data flow analysis...more accurate authorization information." "Our approach...discover authorization requirements by analyzing all possible paths through the program." "It can be seen...the value of Required Permissions (n) (i.e., $RP(n)$) at the input to a node n...by means of a set of union operation").

10. Regarding claim 3, Koved discloses wherein: the one or more assemblies in managed code correspond to an application (Koved: page 3, column 1, third paragraph: "Each Java application class...associated with a set of right, or privileges, granted to the code); and the set of required permissions for each said execution path comprises a union of the permissions for each said execution path (Koved: page 3, column 2; and page 4 column 2: "Since, in general...along paths towards nodes in N_{start} . This process associates a set of required requirements $RP(n)$ with each node n in N_{start} .

More precisely, it computes $RP(n)$ for all n belong to N . "It can be seen that the data flow...by means of a set union operation").

11. Regarding claim 4, Koved discloses wherein: the assemblies in managed code correspond to a shared library (Koved: page 8, column 1, third paragraph: "For a given application or classes in a library...identify the set of Java 2 Permissions required for each class in the analysis scope"); and the set of required permissions for each said execution path comprises one separate permission set per entry point in the shared library (Koved: on page 1, under ABSTRACT section; and page 2, column 1, under Prior Work section: "This paper presents...compute at each program point the set of access rights required by the code"... "authorization tests...to the current approach to defining authorization points within code").

12. Regarding claim 5, this claim has limitations that is similar to those of claims 2 and 3, thus it is rejected with the same rationale applied against claims 2 and 3 above.

13. Regarding claim 6, Koved discloses wherein one of more of the calls in at least one said execution path is an cross assembly call (Koves: on page 2, column 2, third paragraph: "In the aforementioned works...Java runtime calls one of the SecurityManager authorization methods...to correctly identify authorization requirements").

14. Regarding claim 7, Koved discloses wherein: the managed code is built to make use of a common language runtime (on page 2, column 2, third paragraph: "In the aforementioned works...Java runtime calls one of the SecurityManager authorization methods...to correctly identify authorization requirements"); each said assembly is

packaged as an executable entity or as a data link library entity and each said assembly includes one or more methods (Koved: on page 1, under ABSTRACT section; and page 7, column 2, second and third paragraph: "The tool...to identify the access rights requirements for the product to enable it to run using Java 2 security model").

15. Regarding claim 8, Koved discloses wherein the simulation of the execution of each said execution path comprises a simulation of the flow of argument data using intra and extra method data flow analysis for each said method (Koved: on page 2, column 1, second and third paragraph; and page 6, column 2, second paragraph: "To summarize...We present a context sensitive, flow sensitive analysis for computing the access rights requirements of a program." "To minimize conservativeness...the order of execution of instructions both intra- and inter procedurally thus improving the accuracy of the resulting graph").

16. Regarding claim 9, Koved discloses wherein when the executable has permissions to execute that are not less than a union of permission sets for each said execution path, any dynamic execution of the executable will not trigger a security exception (Koved: on page 3, under Authorization Model-Access Rights Invocation Graph section; page 7, column 1, second paragraph; and page 8, column 1, first paragraph: "Performance is improved...NullPointerException in package...").

17. Regarding claim 10, Koved discloses wherein the simulation of the execution comprises, for each said execution path, one or more simulated stack walks that each include a plurality of said assemblies (Koved: on page 3, column 1, first paragraph).

18. Regarding claim 11, Koved discloses a computer readable medium including machine readable instructions for implementing the method as defined in claim 1 (Koved: on page 4, column 1, third paragraph).

19. Regarding claim 12, this claim has limitations that is similar to those of claims 1-6, thus it is rejected with the same rationale applied against claims 1-6 above.

20. Regarding claim 13, Koved discloses wherein the managed code environment comprises: a managed code portion including: the assemblies (Koved: see ABSTRACT section); and a virtual machine (Koved: on page 3, column 1, paragraph 3: "Each Java application...the Java Virtual Machine...to the code"); a native code portion including: an execution engine for the virtual machine (Koved: see ABSTRACT section: "Java...protects systems...execute the code...in deployed systems"); and an operating system under the execution engine (Koved: see ABSTRACT section: "Java...protects systems...execute the code...in deployed systems").

21. Regarding claim 14, this claim has limitations that is similar to those of claim 7, thus it is rejected with the same rationale applied against claim 7 above.

22. Regarding claim 15, this claim has limitations that is similar to those of claim 9, thus it is rejected with the same rationale applied against claim 9 above.

23. Regarding claim 16, this claim has limitations that is similar to those of claim 10, thus it is rejected with the same rationale applied against claim 10 above.

24. Regarding claim 17, Koved discloses wherein the managed code environment enforces partial trust security contexts (Koved: on page 3, column 1, 2 paragraph:

Art Unit: 2131

"Rather than analyzing...enforce specific security policies...updated to enable the code to execute").

25. Regarding claim 18, this claim has limitations that is similar to those of claim 11, thus it is rejected with the same rationale applied against claim 11 above.

26. Regarding claim 19, Koved discloses instructions that, when executed, perform a simulation of the execution of every data and control flow for managed code from which an estimate is derived of the minimum security requirements needed to dynamically execute the managed code without triggering a security exception (Koved: on page 1, column 1; page 7 under Generation of a Security Policy Decryption section; and page 1, column 2, third paragraph, second paragraph: " This paper presents...computing the access rights requirements").

27. Regarding claim 20, this claim has limitations that is similar to those of claim 7 and 14, thus it is rejected with the same rationale applied against claims 7 and 14 above.

28. Regarding claim 21, this claim has limitations that is similar to those of claim 13, thus it is rejected with the same rationale applied against claim 13 above.

29. Regarding claim 22, this claim has limitations that is similar to those of claim 20, thus it is rejected with the same rationale applied against claim 20 above.

30. Regarding claim 23, this claim has limitations that is similar to those of claim 10, thus it is rejected with the same rationale applied against claim 10 above.

31. Regarding claim 24, this claim has limitations that is similar to those of claim 16, thus it is rejected with the same rationale applied against claim 16 above.

32. Regarding claim 25, this claim has limitations that is similar to those of claim 17, thus it is rejected with the same rationale applied against claim 17 above.

33. Regarding claim 26, Koved discloses virtual machine means, in a managed code portion, for operating a plurality of assemblies in managed code, wherein the managed code is a managed shared library or an executable and is in the managed code portion; execution engine means, in a native code portion, for the virtual machine means (Koved: on page 3, column 1, third paragraph: "Each Java application class...Java Virtual Machine...privileges, granted to the code"); means, in a native code portion, for providing an operating system (Koved: on page 3, column 1, third paragraph; and page 4, column 1, first paragraph: "Each Java application class...Java Virtual Machine...privileges, granted to the code"); means for making a call for access by one said assembly to another said assembly for which a permissions set is required (Koved: see ABSTRACT section on page 1); means for gathering the permissions set from each said call (Koved: on page 4, column 1, second paragraph); means for deriving a union of the gathered permissions sets (Koved: on page 3 under Authorization Model-Access Rights Invocation Graph section); and means for simulating the execution of all possible execution paths for the managed shared library or the executable to derive therefrom the derived union of the gathered permissions sets (Koved: on page 3 under Authorization Model-Access Rights Invocation Graph section).

34. Regarding claim 27, Koved discloses means for compiling the assemblies from an intermediate language code and metadata into native code; and means for loading the native code with a Common Language Runtime (CLR) loader in the native code

portion to load the compiled native code, wherein the execution engine means executes the compiled native code in the native code portion (Koved: on page 3, column 1, first paragraph: "Permission.implies...test cases").

35. Regarding claim 28, Koved discloses wherein the managed code portion further comprises one or more files associated with user code that, when compiled into an intermediate language code and metadata generated by a language compiler, are represented by the assemblies (Koved: on page 3, column 1, third paragraph: "Each Java application class...Java Virtual Machine...privileges, granted to the code").

36. Regarding claim 29, Koved discloses wherein the execution engine means in the native code portion further comprises a compiler to compile each said assembly into native code for execution by the native code portion (Koved: on page 3, column 1, third paragraph: "Each Java application class...Java Virtual Machine...privileges, granted to the code").

37. Regarding claim 30, Koved discloses wherein the execution engine means in the native code portion further comprises: a Just In Time (JIT) compiler to compile each said assembly into native code; and a CLR loader to load the compiled native code for execution by the native code portion (on page 3, column 1, third paragraph: "Each Java application class...Java Virtual Machine...privileges, granted to the code").

38. Regarding claim 31, Koved discloses means, in the native code portion, for forming a response to the call; and means for returning the response to the first assembly in the managed code portion (Koved: on page 3, column 1, third paragraph;

and page 4, column 1, first paragraph: "Each Java application class...Java Virtual Machine...privileges, granted to the code").

39. Regarding claim 32, Koved discloses wherein: the managed code is built to make use of a common language runtime; each said assembly is packaged as an executable entity or as a data link library entity; and each said assembly includes one or more methods (Koved: on page 1, under ABSTRACT section; and page 7, column 2, second and third paragraph: "The tool...to identify the access rights requirements for the product to enable it to run using Java 2 security model").

40. Regarding claim 33, Koved discloses wherein the simulation of the execution comprises, for each said execution path, a simulation of the flow of argument data using intra and extra data flow analysis for each said method (Koved: on page 2, column 1, second and third paragraph; and page 6, column 2, second paragraph: "To summarize...We present a context sensitive, flow sensitive analysis for computing the access rights requirements of a program." "To minimize conservativeness...the order of execution of instructions both intra- and inter procedurally thus improving the accuracy of the resulting graph").

41. Regarding claim 34, this claim has limitations that is similar to those of claim 9, thus it is rejected with the same rationale applied against claim 9 above.

42. Regarding claim 35, this claim has limitations that is similar to those of claim 10, thus it is rejected with the same rationale applied against claim 10 above.

43. Regarding claim 36, Koved discloses wherein each call in each said simulated stack walk has a corresponding said permissions set (Koved: on page 3 under

Authorization Model-Access Rights Invocation Graph section: "For any node...set of required Permissions for n").

44. Regarding claim 37, this claim has limitations that is similar to those of claim 17, thus it is rejected with the same rationale applied against claim 17 above.

45. Regarding claim 38, this claim has limitations that is similar to those of claim 26, thus it is rejected with the same rationale applied against claim 26 above.

46. Regarding claim 39, this claim has limitations that is similar to those of claims 27 and 28, thus it is rejected with the same rationale applied against claims 27 and 28 above.

47. Regarding claim 40, this claim has limitations that is similar to those of claim 30, thus it is rejected with the same rationale applied against claim 30 above.

48. Regarding claim 41, this claim has limitations that is similar to those of claim 22, thus it is rejected with the same rationale applied against claim 22 above.

49. Regarding claim 42, this claim has limitations that is similar to those of claim 8, thus it is rejected with the same rationale applied against claim 8 above.

50. Regarding claim 43, this claim has limitations that is similar to those of claims 9 and 15, thus it is rejected with the same rationale applied against claims 9 and 15 above.

51. Regarding claim 44, this claim has limitations that is similar to those of claim 10, thus it is rejected with the same rationale applied against claim 10 above.

52. Regarding claim 45, this claim has limitations that is similar to those of claim 17, thus it is rejected with the same rationale applied against claim 17 above.

Conclusion

53. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Kershenbaum et al. discloses method and apparatus for automatically determining optimum placement of privileged code locations in existing code (US 2004/0040017).
- Stefik et al. discloses method and apparatus for executing code in accordance with usage rights (US 2003/0225698).
- Anand et al. discloses flexible and dynamic derivation of permissions (US 6044466).
- Sun et al. discloses packaging system for customizing software (US 20040237067).
- Gong discloses secure class resolution, loading and definition (US 6044467).
- Apperson et al. discloses system and method for safety distributing executable objects (US 5978484).
- Griffin et al. discloses trusted delegation system (US 5958050).
- Koved discloses multiple resource or security contexts in a multithreaded application (US 5915085).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trang Doan whose telephone number is (571) 272-0740. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Trang Doan
Examiner
Art Unit 2131

T.D.


AYAZ SHEIKH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100